

REMARKS

This is a full and timely response to the outstanding Office Action mailed September 6, 2005. In this amendment, claims 38 and 57 has been amended. Claims 38-52 and 55-57 remain pending in this application. Applicant has amended claims 38 and 57 as suggested by the Examiner. Applicant submits that no new matter has been added to this application by these amendments.

Discussion of Rejections Under 35 U.S.C. 102

Claims 38, 49-50 and 57 stand rejected under 35 U. S. C. 102(b) as allegedly anticipated by *Shishido et al.* (US 6,294,831)

In this regard, *Shishido et al.* teach a package with a thermally conductive structure. Specifically, the thermally conductive structure (heat spreader) 46 has a pattern of openings 48 not piercing the thermally conductive structure. (See cover Fig. and Fig. 5(a)). Further, the pattern of openings 48 is shown beyond the outer closed dot line in cover Fig. and Fig. 5(a).

With respect to claim 38, as amended this claim recites:

38. A ball grid array package, comprising:
a semiconductor chip/die affixed to a ball grid substrate; the ball grid substrate having a series of balls; and
a heat spreader mounted to the semiconductor chip/die and the ball grid substrate opposite the series of balls; the heat spreader having a pattern of slots, not completely piercing the heat spreader, therein, *wherein the pattern of the slots comprises a circular pattern; a radiating pattern; a rectangular pattern, a concentric circular pattern, or a concentric octagonal pattern.*

(*Emphasis Added*).

The Office Action has relied on apparent teachings from the cover Fig. and Fig. 5(a), which are cross-sections, which cannot clearly illustrate the pattern of opening disclosed by *Shishido et al.* In Col. 4, lines 40-50, *Shishido et al.* appears to disclose materials for the structure 42 and

that the openings 48 may be filled with synthetic resin 50. However, *Shishido* does not teach or otherwise disclose the additional limitations emphasized above in claim 38.

Thus, Applicant respectfully asserts that the cited art is deficient for the purpose of anticipating claim 38. In particular, Applicant respectfully asserts that that cited art does not teach or otherwise disclose at least the expressly claimed limitation of "*wherein the pattern of the slots comprises a circular pattern; a radiating pattern; a rectangular pattern, a concentric circular pattern, or a concentric octagonal pattern.*" For at least this reason, the rejection of claim 38 is misplaced and should be withdrawn.

Applicant respectfully asserts that this limitation (*i.e.* the pattern of the slots comprising a circular pattern; a radiating pattern; a rectangular pattern, a concentric circular pattern, or a concentric octagonal pattern) is not taught or reasonably suggested by any or a combination of the cited references. For at least this reason, Applicant respectfully asserts that claim 38 is in condition for allowance.

As claims 39 – 52 and 55 – 56 are dependent claims that incorporate the limitations of claim 38, Applicant respectfully asserts that these claims also are in condition for allowance. Additionally, these claims recite other limitations that can serve as an independent basis for patentability.

With respect to independent claim 57, that claim has been amended to recite:

57. A ball grid array package, comprising:
a semiconductor chip/die affixed to a ball grid substrate; the ball grid substrate having a series of balls; and
a heat spreader mounted to the semiconductor chip/die and the ball grid substrate opposite the series of balls; the heat spreader having a pattern of slots, not completely piercing the heat spreader, therein, *wherein the slots penetrate the heat spreader from about 50 to 75%.*

(*Emphasis Added*).

Shishido et al. appear to teach a package with a thermally conductive structure. Specifically, the thermally conductive structure (heat spreader) 46 has a pattern of openings 48 not piercing the thermally conductive structure. (See Fig. 5(a)). Further, the cover Fig. and Fig. 5(a) of *Shishido et al.* clearly show the openings 48 penetrating the thermally conductive structure (heat spreader) 46 less than 50%.

Applicant respectfully asserts that the limitation emphasized above (*i.e.* the slots penetrate the heat spreader from about 50 to 75%) clearly defines over the teachings of *Shishido*. Use of such a feature is not taught or reasonably suggested by any or a combination of the cited references. Therefore, Applicant respectfully asserts that claim 57 is in condition for allowance.

Discussion of Rejections Under 35 U.S.C. § 103

The Office Action has rejected claims 39-40 and 45-46 under 35 U.S.C. § 103(a) as allegedly unpatentable over the combination of *Shishido* in view of *Ho* (U.S. published application 2002/0079570). The Office Action also rejected claims 41-44 as allegedly obvious over the combination of *Shishido* and *Kubo* (U.S. patent 6,199,273). Applicant respectfully disagrees.

In this regard, Applicant respectfully submits that the Office Action has failed to cite a proper motivation or suggestion for combining the cited references. For example, in combining *Ho* with *Shishido*, the Office Action stated only that the combination would have been obvious because "the silicon semiconductor chip is well known in the art for improving the heat dissipating characteristics." (Office Action, p. 4) This alleged motivation is clearly improper in view of well-established Federal Circuit precedent. In this regard, there are numerous structures

or ways of dissipating heat. For the motivation to be proper, the motivation must suggest the particular structure or approach of the claim.

Likewise, in combining Kubo with Shishido, the Office Action stated only that the combination would have been obvious "in order to improve the electric contact characteristics for the semiconductor package." (Office Action, pp. 4-5). Applicant respectfully disagrees.

It is well-settled law that in order to properly support an obviousness rejection under 35 U.S.C. § 103, there must have been some teaching in the prior art to suggest to one skilled in the art that the claimed invention would have been obvious. W. L. Gore & Associates, Inc. v. Garlock Thomas, Inc., 721 F.2d 1540, 1551 (Fed. Cir. 1983). More significantly,

"The consistent criteria for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this [invention] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. ..." Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure... In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill in the art is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention."

(*Emphasis added.*) In re Dow Chemical Company, 837 F.2d 469, 473 (Fed. Cir. 1988).

In this regard, Applicant notes that there must not only be a suggestion to combine the functional or operational aspects of the combined references, but that the Federal Circuit also requires the prior art to suggest both the combination of elements and the structure resulting from the combination. Stiftung v. Renishaw PLC, 945 Fed.2d 1173 (Fed. Cir. 1991). Therefore, in order to sustain an obviousness rejection based upon a combination of any two or more prior art references, the prior art must properly suggest the desirability of combining the particular elements to derive an SBGA design, as claimed by the Applicant.

When an obviousness determination is based on multiple prior art references, there must be a showing of some "teaching, suggestion, or reason" to combine the references. Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed. Cir. 1997) (also noting that the "absence of such a suggestion to combine is dispositive in an obviousness determination").

Evidence of a suggestion, teaching, or motivation to combine prior art references may flow, inter alia, from the references themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. See In re Dembiczak, 175 F.3d 994, 1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Although a reference need not expressly teach that the disclosure contained therein should be combined with another, the showing of combinability, in whatever form, must nevertheless be "clear and particular." Dembiczak, 175 F.3d at 999, 50 USPQ2d at 1617.

If there was no motivation or suggestion to combine selective teachings from multiple prior art references, one of ordinary skill in the art would not have viewed the present invention as obvious. See In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); Gambro Lundia AB, 110 F.3d at 1579, 42 USPQ2d at 1383 ("The absence of such a suggestion to combine is dispositive in an obviousness determination.").

Significantly, where there is no apparent disadvantage present in a particular prior art reference, then generally there can be no motivation to combine the teaching of another reference with the particular prior art reference. Winner Int'l Royalty Corp. v. Wang, No 98-1553 (Fed. Cir. January 27, 2000).

Merely citing some resultant advantage of a combination is insufficient to satisfy the legal requirement for a proper motivation or suggestion. Instead, such a suggestion must be found in

the prior art itself. For at least this additional reason, Applicant submits that the rejections of claims 39-40 and 41-44 are improper and should be withdrawn.

Likewise, the Office Action rejected claims 47-48 as allegedly obvious over the combination of Shishido in view of Ho and in further view of Jayaraman (U.S. patent 6,724,091), alleging that the combination would have been obvious "in order to use the semiconductor package in a particular application." Candidly, the undersigned attorney does not even understand this alleged rationale, and it certainly fails to comply with the precedent of the Federal Circuit.

The Office Action also rejected claims 49-56 as allegedly unpatentable over the combination of Shishido in view of Dordi (U.S. patent 5,835,355), alleging that the combination would have been obvious "in order to reduce the amount of moisture from being trapped by the heat spreader and provide good heat dissipation for the semiconductor package." (Office Action p. 6). Again, Applicant respectfully submits that this rationale fails to comply with the requisite legal standards, and for at least this reason the rejection should be withdrawn.

Cited Art of Record

The cited art of record is not believed to impact the patentability of the presently pending claims.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the pending claims are in condition for allowance.

Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

No fee is believed to be due in connection with this Amendment and Response. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

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